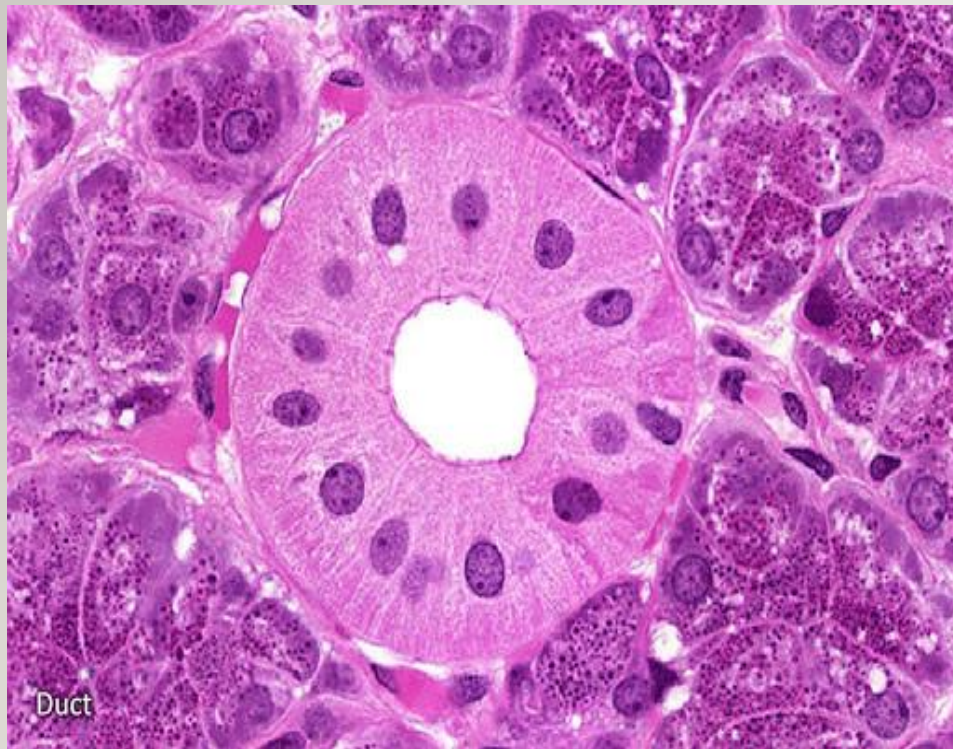




Medical Biology – Year I



Chapter 2: Histology

Lecture 7

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The Stratified Epithelia

- ❑ **The stratified epithelial** tissues consist of more than one layer of cells, the basal layer always in contact with basement membrane, while the other layers are rest on the apical surfaces of the cells.
- ❑ According to the **morphology of the superficial layer of cells**, the stratified epithelial tissues are classified into four type:-

- 1- Stratified squamous epithelium
- 2- Stratified cuboidal epithelium
- 3- Stratified columnar epithelium
- 4- Transitional epithelium



1- Stratified squamous epithelium

The stratified squamous epithelium consists of different number of cellular layers, the basal layer is cuboidal, the middle layers are polyhedral cells and the superficial layers are flattened cells.

- Stratified squamous epithelium provide protection against:
 - 1- Mechanical friction – the superficial cells are rubbed away and replaced from the basal generative layer , as that esophagus and vagina.
 - 2- Chemical damage

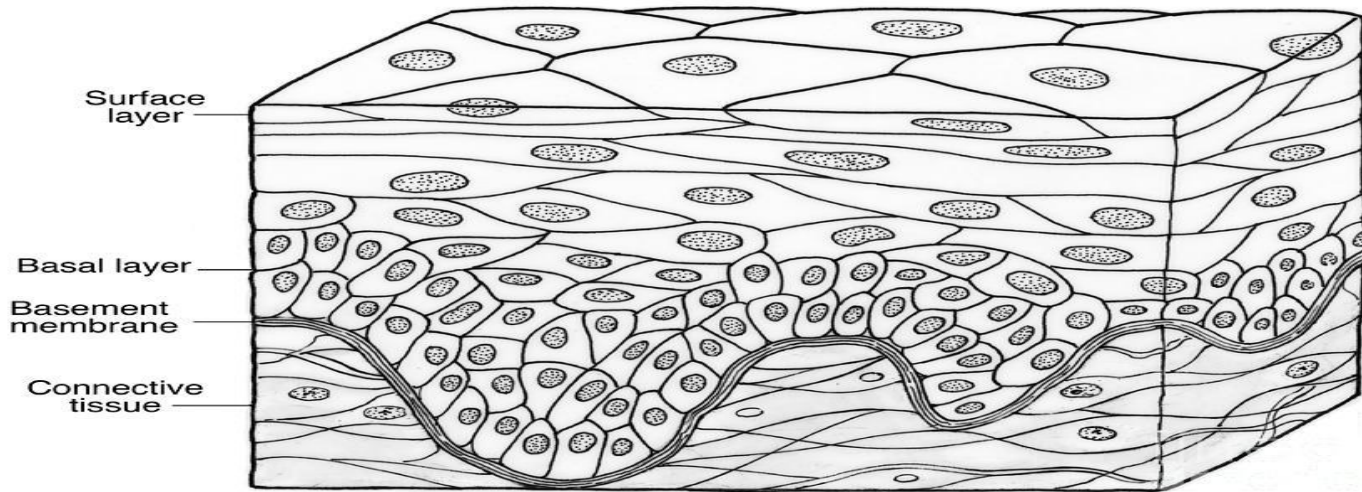
Types

1. Nonkeratinized (moist):- that lines the oral cavity ,esophagus, vagina and anal canal.

2. Keratinized (dry):- Epidermis of the skin. the surface cells are dead and filled with an inert protein, keratin, forming flakes or *squames*.

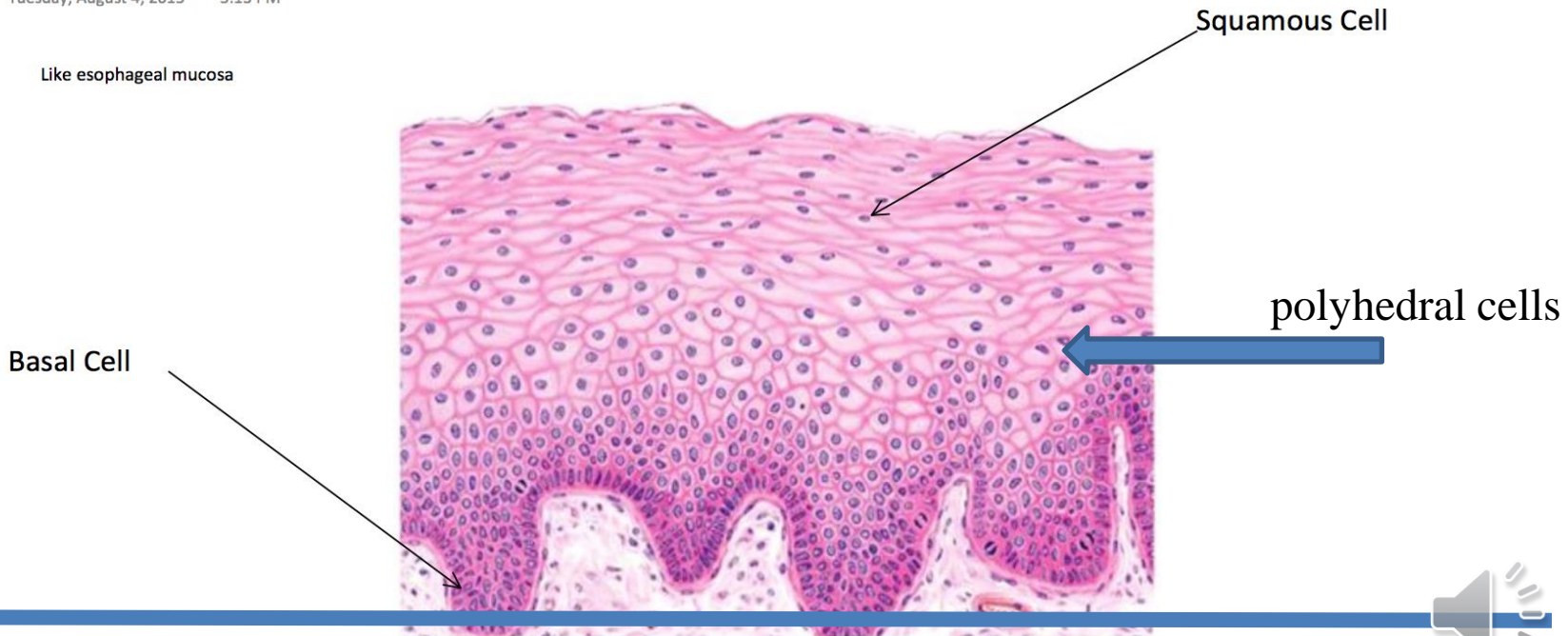


Stratified Squamous Epithelium

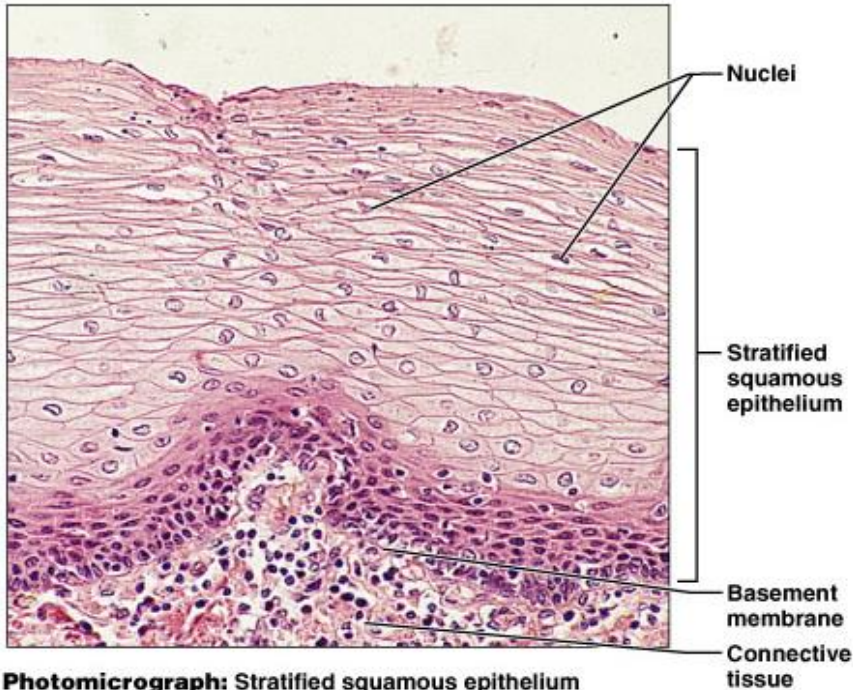


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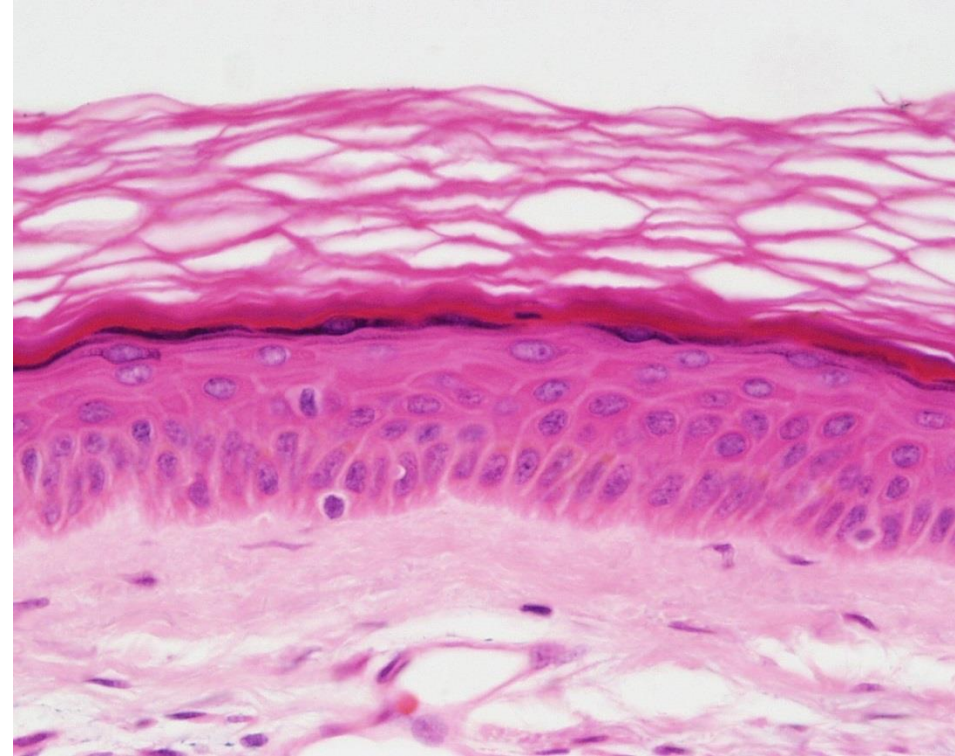
Like esophageal mucosa



Stratified Squamous Epithelium



Photomicrograph: Stratified squamous epithelium lining of the esophagus (300 \times).



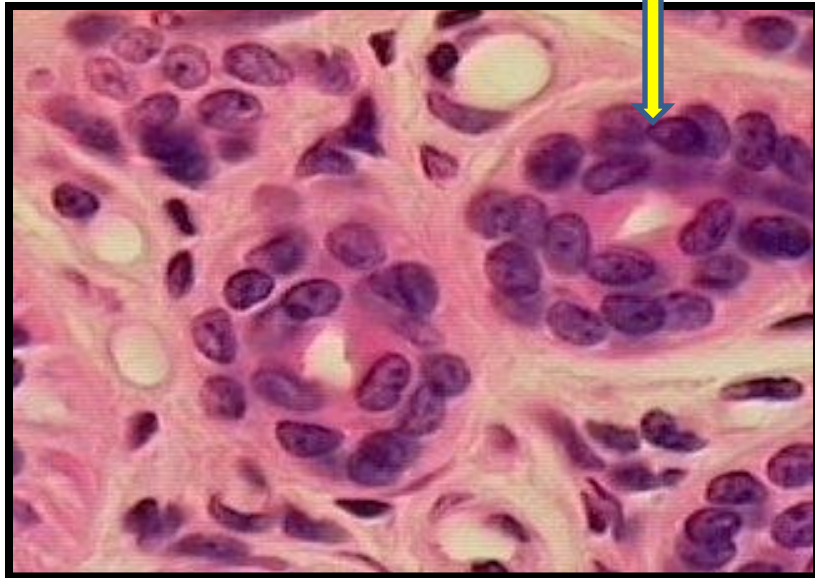
Non-keratinized vs. Keratinized



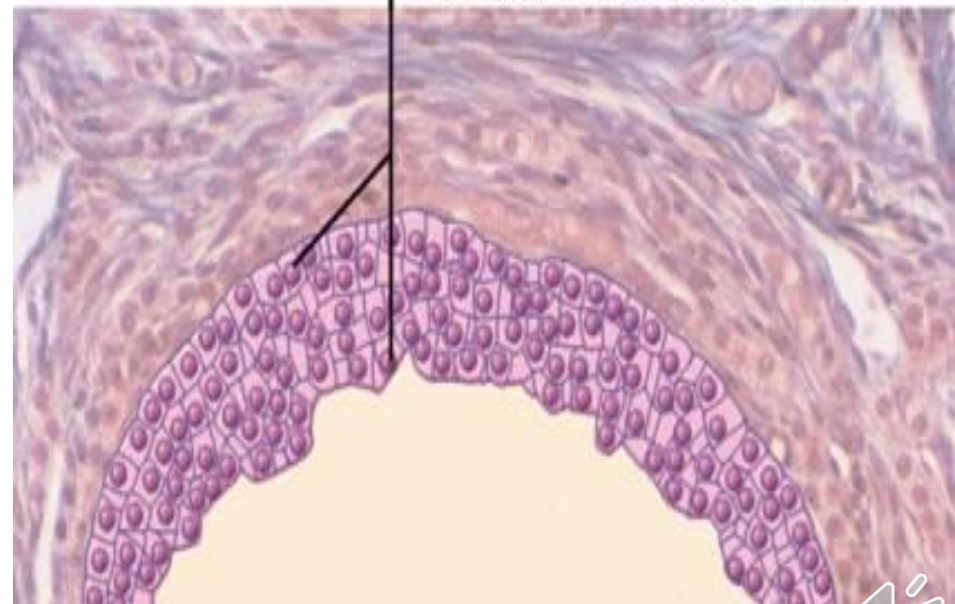
2- Stratified cuboidal epithelium

- **The stratified cuboidal epithelium** is a thin epithelium of two layers of **cubic cells**
 - This type of epithelia linings of larger ducts of mammary glands, sweat glands, salivary glands, and pancreas to provide a tough protection and prevent any leakage of material a way of the duct.

stratified cuboidal cell



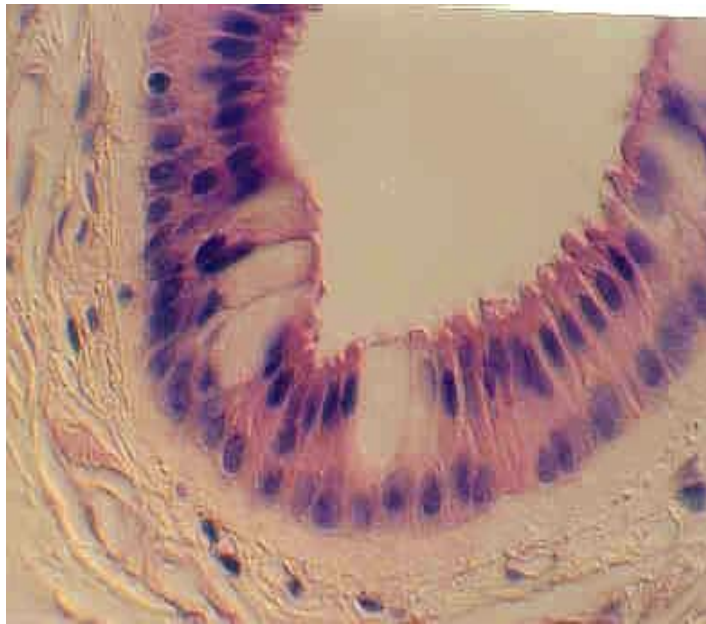
Stratified cuboidal cells



3- Stratified columnar epithelium

❑ **Stratified columnar epithelium** consists of **two or more layers** of different types of cells, the **basal one is cuboidal** or **low columnar** cells, the **middle layers are of polyhedral** and the **superficial layer is of tall columnar cells**.

- This epithelium lines part of the **male urethra** and some **glandular ducts of the pharynx**.



Stratified columnar epithelium

Columnar apical cell

Cuboidal basal cell

Cell nuclei

Lumen of duct

Connective tissue

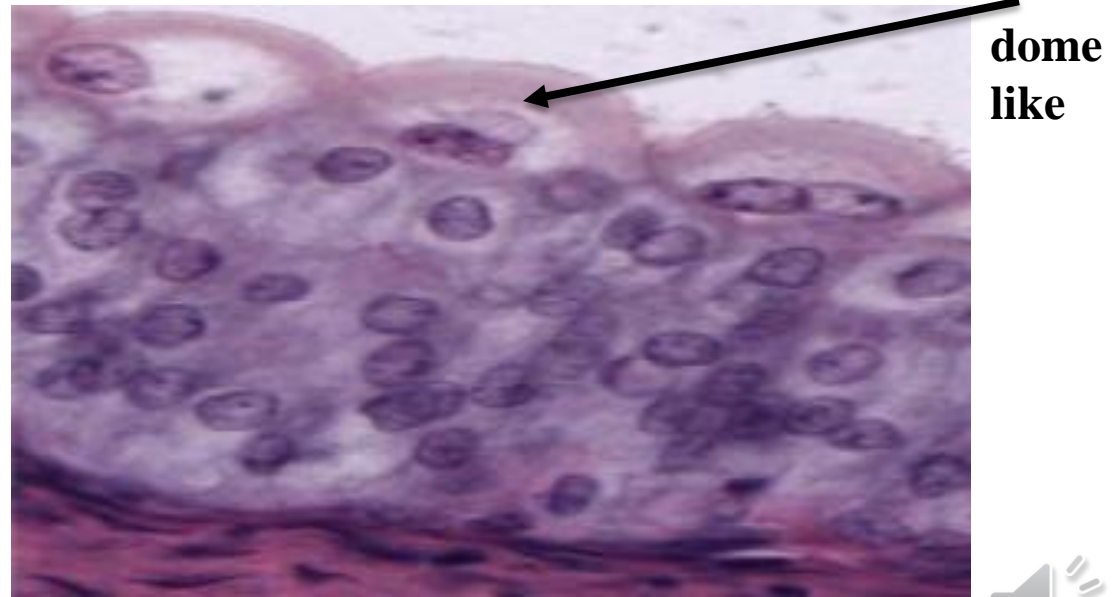
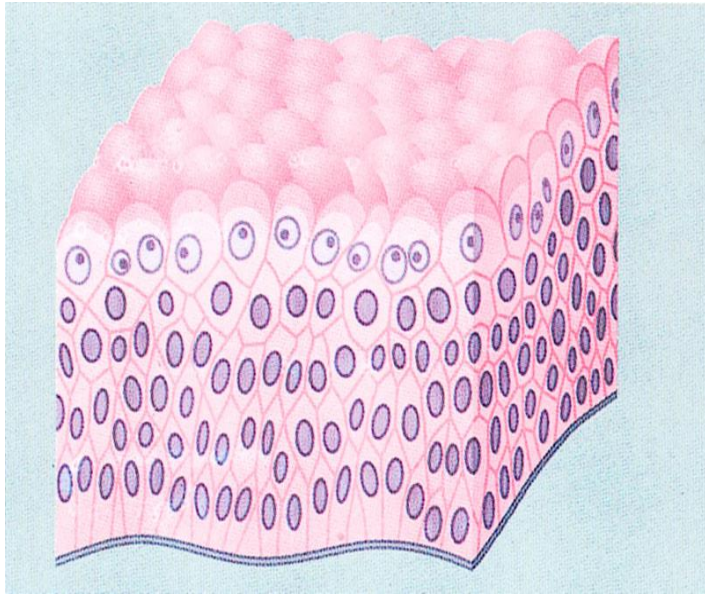


4- Transitional epithelium

❑ **Transitional epithelium** consists of several to many layers of cells depending upon the mechanical stress placed upon it, the **basal layer** is of **cuboidal or low columnar cells**, the **intermediate layer** is of polyhedral cells. The **surface** consist of **3-6 layers of cells**, the **apical layer** is of **large rounded, dome like mono nucleated or bi nucleated cells**.

Locations – Lines the urinary bladder and ureter

Functions – Protection and To allow large changes in the volume of the lumen.



2- Glandular epithelium

- **Develop** from or within a lining or covering epithelium
- **Secretory cells** may
 - Differentiate but remain in the lining epithelium
 - Invaginate into the underlying connective tissue and remain attached to the lining epithelium
 - Invaginate into the underlying connective tissue but lose their connection to the epithelium.

Classification of glandular epithelium

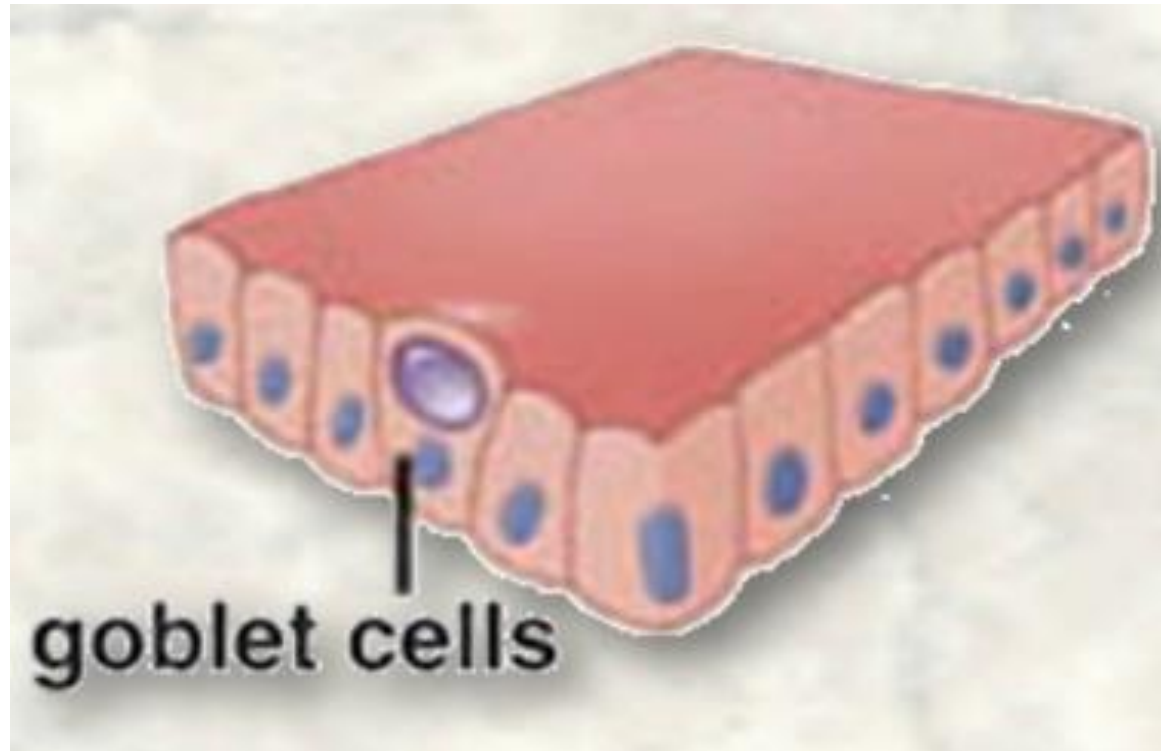
According to:

- **Number of cells.**
 - Unicellular & multicellular.
- **Structure of the gland.**
 - Simple & branched
- **Mode of secretion.**
 - Exocrine & endocrine.
- **Type of secretion.**
 - Serous, mucous etc ...
- **Cellular changes after secretion.**
 - Merocrine, Apocrine and Holocrine



Exocrine Gland

Unicellular (Goblet cells)



Exocrine Gland

Multicellular Exocrine Gland types

1- Simple tubular:-

No duct; secretory cells are arranged like a test tube that connects directly to the surface epithelium (intestinal glands, Crypts of Leiberkuhn).

2- Simple, branched tubular:-

No duct; tubular glands whose secretory units Branch (Gastric glands in stomach).

3- Simple, coiled tubular:-

Long unbranched duct; the secretory unit is a long coiled tube (sweat glands).

4- Simple, branched acinar (alveolar):-

Secretory units are branched and open into a single duct (sebaceous glands).

5- Compound tubular:-

Branching ducts with tubular secretory units (Brunner's gland of the duodenum).

6- Compound acinar (alveolar):-

Branching ducts with acinar secretory units (parotid salivary gland)

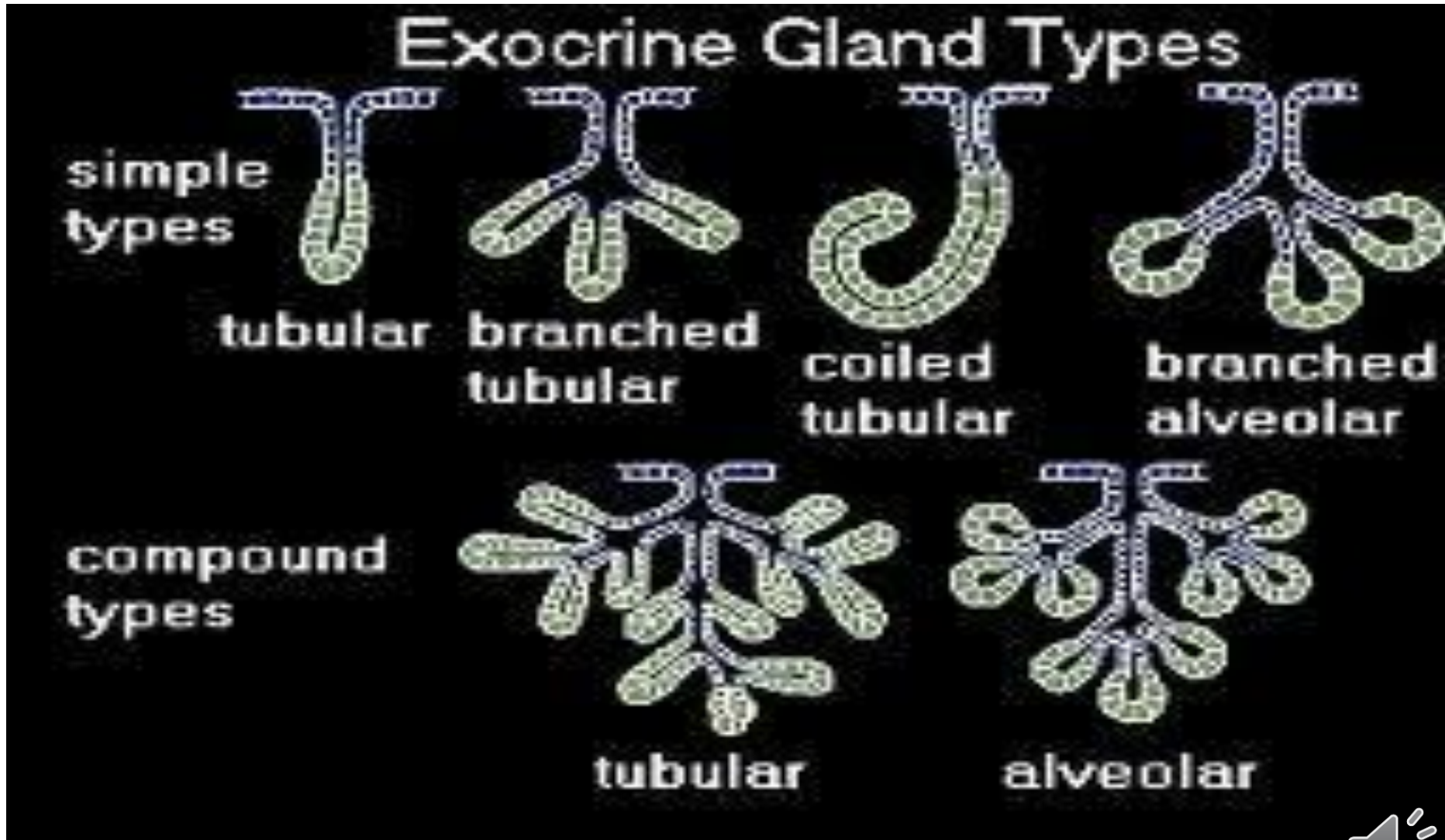
7- Compound tubuloacinar (alveolar):-

Branching ducts with both tubular and acinar secretory units (submaxillary salivary gland)



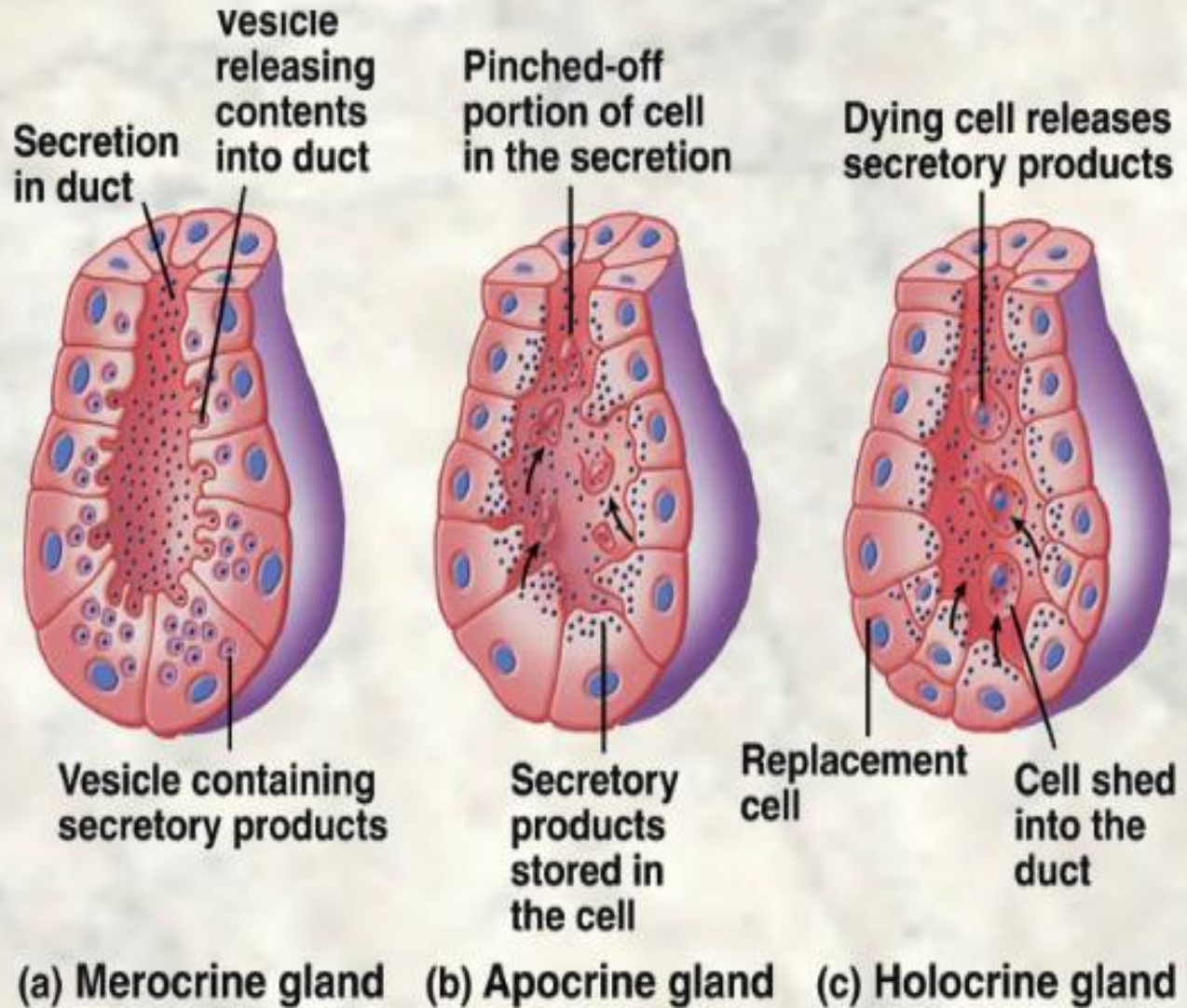
Exocrine Gland

Multicellular



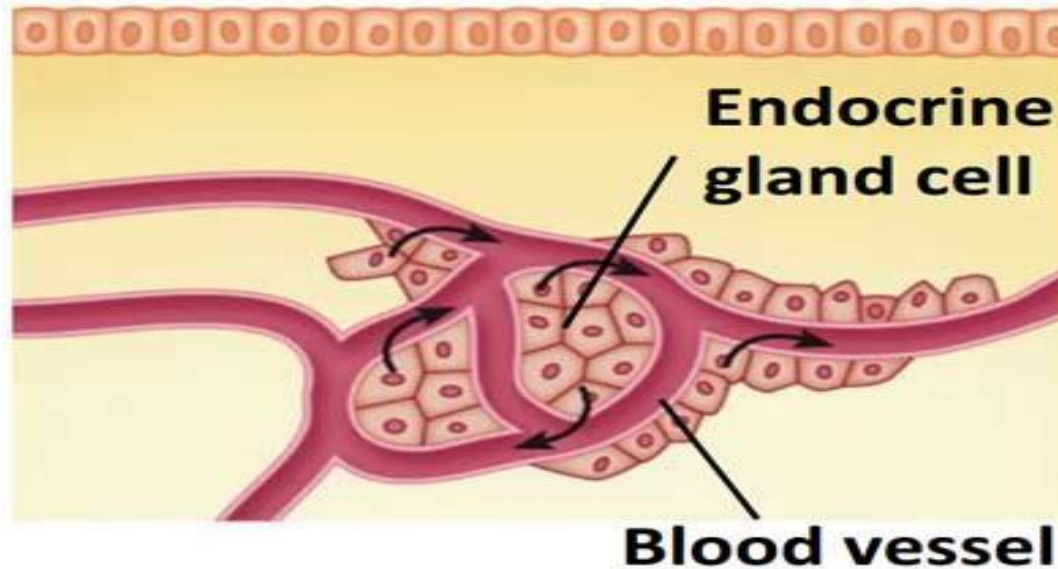
Exocrine Gland & Secretion type

- **Merocrine**
 - Sweat glands
- **Apocrine**
 - Mammary glands
- **Holocrine**
 - Sebaceous glands



2- Endocrine glands

- ❖ No ducts; secretory products are released directly into the extracellular fluid where they can affect adjacent cells or enter the bloodstream to influence cells throughout the body (thyroid, adrenals, pancreas) . Secretory products are called **hormones**.



THANK YOU

